3Com® V7300 Voice Applications Suite

Unified Messaging Suite Intelligent Mirroring Guide

VCX™ V7000 IP Telephony Solution
System Release 5.0

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ABOUT THIS GUIDE

This chapter contains an overview of this guide, lists guide conventions, related documentation, and product compatibility.

Assumptions

This guide is intended for system administrators and assumes you have basic skills such as:

- Basic UNIX command line usage
- Knowledge of Solaris operating system utilities

If the information in the release notes differs from the information in this guide, follow the instructions in the release notes.

Conventions

This section describes notice and text conventions used in this guide.

Notices

Table 1 lists notice icons used in this guide.

Table 1 Notice Icon Descriptions

Icon	Notice Type	Description
	Information note	Information that contains important features or instructions.
	Caution	Information to alert you to potential damage to a program, system, network, or device.
	Warning	Information to alert you to potential personal injury or fatality. May also alert you to potential electrical hazard.

Text Table 2 lists text conventions that are used in this guide.

Table 2 Text Convention Descriptions

Convention	Description
Text represented as a screen display	This typeface represents displays that appear on your terminal screen, for example: `Netlogin:`
Text represented as user entry.	This typeface represents information that you must type, for example: **`cd /usr/bin`**
Text represented as menu or sub-menu names	This typeface represents all menu and sub-menu names within procedures, for example: On the **File** menu, click **New.**
Text represented by <filename>	This typeface represents a variable, for example: *<filename>*

Related Documentation The following lists 3Com documents that contain additional information about the products in this release.

- V7000 System Applications Guide
- VCX V7210 and V7220 Installation and Initial Configuration Guide
- VCX V7210 Administration Guide
- VCX V7220 Administration Guide
- VCX V7210 Configuration and Maintenance Guide
- VCX V7220 Configuration and Maintenance Guide
- VCX V7230 Enterprise Management Suite User Guide
- 3Com Telephone User Guide
- 3Com V7300 Voice Applications Product Overview
- 3Com V7300 Voice Applications Installation Guide
- 3Com V7300 Voice Applications Provisioning Guide
- 3Com V7300 Voice Applications User Guide

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Please include the following information with your comments:

- Document title
- Document part number (found on the front page)
- Page number
- Your name and organization (optional)

Example:

3Com® V7300 Voice Applications Suite
Messaging Applications Intelligent Mirroring Guide
Part Number 900-0153-01 Rev AA
Page 15

> *Please address all questions regarding the 3Com software to your authorized 3Com representative.*

1

INITIAL CONFIGURATION

This chapter provides an overview of how to configure Intelligent Mirroring on a Primary and Secondary server for the V7300 Voice Applications Suite.

Intelligent Mirroring is the mirroring of application data on two independently running servers. The mirrored application data is composed of table data and message component files.

Overview

When you configure two servers for Intelligent Mirroring:

- One of the servers operates in the active state
- The other operates in standby state

At any one time, either the Primary or the Secondary server can be in the active state.

You can install the Primary and Secondary servers on the same network or, for added reliability, you can connect each of them to an A and a B network (see). Both approaches are described in this guide.

Before you begin to install Intelligent Mirroring on the Primary and Secondary servers, verify that you have the equipment and information outlined in the next two sections.

Hardware Prerequisites

The Primary and Secondary Intelligent Mirroring servers run on the same hardware platforms that run the messaging system software.

3Com recommends that you connect each server to two different subnetworks for added reliability. To make these connections, each server requires two network interface cards, for a total of four cards.

IP Configuration   3Com recommends that you define the IP configuration using the
                        `/etc/hosts` files on the two systems.

                        The `/etc/hosts` file on each server must contain identical information
                        about the Intelligent Mirroring configuration. Other information in the
                        file may vary. The examples in this document contain the information
                        that must be identical.

                        For each network to which Intelligent Mirroring is connected, you
                        must configure four unique IP addresses, all on the same subnetwork:

                        ■ Two of these addresses are static and are assigned to the primary
                          network interface cards on the two systems.

                        ■ The other two IP addresses are aliases that are dynamically assigned
                          based on the state (active versus standby) of the Intelligent Mirroring
                          servers. These addresses are not associated with any hardware.

Single Network   To configure both the Primary and Secondary servers on a single network,
Configuration   follow the instructions in this section. For the instructions on how to
                        configure the servers on two networks, see Dual Network Configuration.

                        3Com recommends that you configure the systems on which
                        Intelligent Mirroring runs so that each one is connected to two
                        independent networks on separate switches. This provides additional
                        reliability should problems develop on either network (for example, if
                        a switch fails). See .

                        The examples in this section are based on these assumptions:

                        System 1 (Primary Server)

                        ■ **System Name** — voipbox1

                        ■ **IP Address (subnetwork 126)** — 192.168.126.1 (associated with
                          the primary network interface on the Primary Server)

                        System 2 (Secondary Server)

                        ■ **System Name** — voipbox2

                        ■ **IP Address (subnetwork 126)** — 192.168.126.2 (associated with
                          the primary network interface on the Secondary Server)

⚠ **CAUTION:** *IP addresses 192.168.126.3 and 192.168.126.4 are the dynamic alias IP addresses. Do not associate them with any network interface.*

Sample /etc/hosts File Entries for a Single Network Configuration

This section describes entries that you would add to the /etc/hosts file if your configuration was identical to the configuration examples listed earlier in this section.

```
#
# Internet host table
#
192.168.126.1 voipbox1 voipbox1a voipbox1b voipbox1c voipbox1d
192.168.126.2 voipbox2 voipbox2a voipbox2b voipbox2c voipbox2d
192.168.126.3 active activea activeb activec actived
192.168.126.4 standby standbya standbyb standbyc standbyd
```

⚠ **CAUTION:** *The host names that end in a, b, c, and d are used internally by Intelligent Mirroring or Call Builder (or both). These names must be present in the /etc/hosts file.*

Dual Network Configuration

To configure the Primary and Secondary servers so that they are each connected to two networks, follow the instructions in this section.

ℹ *Dual network configuration is possible only if the UMS software is running on different servers than the Call Processor software. If you are running all VCX software on a single pair of servers, you cannot configure UMS for dual networks.*

ℹ *3Com recommends that you configure the systems on which Intelligent Mirroring runs so that each one is connected to two independent networks on separate switches. This provides additional reliability should problems develop on either network (for example, if a switch fails).*

ℹ *The examples in this section are based on the assumption that two subnetworks (192.168.126.XXX and 192.168.127.XXX) are used. If you choose not to use subnetworks, modify the examples accordingly.*

Figure 1 Dual Network Configuration
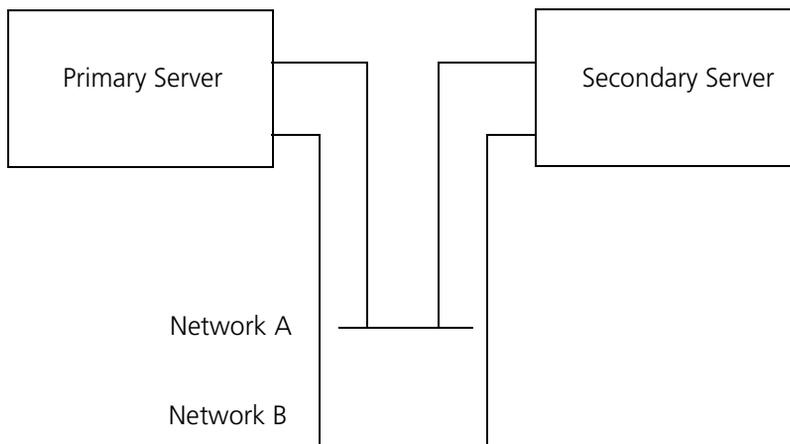
System 1 (Primary Server)

- **System Name** — voipbox1
- **IP Address (subnetwork 126)** — 192.168.126.1 (associated with the primary network interface on the Primary Server)
- **IP Address (subnetwork 127)** — 192.168.127.1 (associated with the secondary network interface on the Primary Server)

System 2 (Secondary Server)

- **System Name** — voipbox2
- **IP Address (subnetwork 126)** — 192.168.126.2 (associated with the primary network interface on the Secondary Server)
- **IP Address (subnetwork 127)** — 192.168.127.2 (associated with the secondary network interface on the Secondary Server)

⚠ *CAUTION: IP addresses 192.168.126.3, 192.168.126.4, 192.168.127.3, and 192.168.127.4 are the dynamic alias IP addresses. Do not associate them with any network interface.*

Sample /etc/hosts File Entries for a Dual Network Configuration

This section describes entries that you would add to the /etc/hosts file if your configuration was identical to the configuration examples listed earlier in this section.

```
#
# Internet host table
#
192.168.126.1 voipbox1 voipbox1a voipbox1c
192.168.126.2 voipbox2 voipbox2a voipbox2c
192.168.126.3 active activea activec
192.168.126.4 standby standbya standbyc
192.168.127.1 voipbox1b voipbox1d
192.168.127.2 voipbox2b voipbox2d
192.168.127.3 activeb actived
192.168.127.4 standbyb standbyd
```

⚠ **CAUTION:** *The host names that end in a, b, c, and d are used internally by Intelligent Mirroring or Call Builder (or both). These names must be present in the /etc/hosts file.*

Domain Name System (DNS) Configuration

To enable proper operation of the UMS e-mail server (SMTP, POP3, and IMAP) you must configure the DNS servers on your network.

To configure a DNS server:

1 Create a host name for the UMS e-mail server.

ⓘ *The domain name of the UMS e-mail server is the host name that you just created, together with the appropriate DNS suffix.*

2 Bind both the primary and secondary IP address of the e-mail server to the host name that you just created.

ⓘ *If the VCX system is a single-box configuration, you need only bind the one IP address of the system to the host name.*

3 Restart the named service on the DNS server to update the server settings with the new configuration information.

i *For any PC on which you intend to run an e-mail client program, configure the PC so that it uses, as its primary DNS server , the DNS server that you have just configured.*

Sample DNS Names and Files

Modify these sample host and file names to conform to your network configuration.

- **E-mail Server Host Name** — umsemail
- **DNS Suffix** — vcx.wan.3com.com
- **Domain Name** — umsemail.vcx.wan.3com.com

Sample named.conf file on the DNS server

```
controls {
inet 127.0.0.1 allow { localhost; } keys { "rndc-key"; };
};
include "/etc/bind_db/rndc.key";
options {
directory "/etc/bind_db";
pid-file "/var/run/named.pid";
allow-query { any; };
forward first;
forwarders {
192.168.15.2;
192.168.15.3;
};
};
zone "." {
type hint;
file "root.hints";
};
zone "0.0.127.in-addr.arpa" {
type master;
file "master/127.0.0";
};
zone "vcx.wan.3com.com" {

            type master;

            file "master/vcx.wan.3com.com";

        };
```

Sample file "vcx.wan.3com.com"

```
$TTL 86400
@  IN   SOA   vcx.wan.3com.com. root.vcx.wan.3com.com. (
200210210; serial, todays date + todays serial #
8H; refresh, seconds
2H; retry, seconds
1W; expire, seconds
1D ); minimum, seconds
NS   galaxy
High light this MX record entry
MX10 umsemail
TXT   "Voice Core eXchange, 3Com Corporation"
localhost   -A       127.0.0.1
umsemail    A        192.168.126.1
            A        192.168.126.2
voipbox1    -A       192.168.126.1
voipbox2    -A       191.168.126.2
```

Verifying DNS Configuration

To verify that the DNS server is properly configured for UMS:

1 On a PC where you run the e-mail client, open a command window.

2 Enter this command:

   nslookup umsemail

   The output from the command should look something like this:

```
E:\UMS>nslookup umsemail
Server: galaxy.vcx.wan.3com.com
Address: 192.168.126.1

Name: umsemail.vcx.wan.3com.com
Addresses: 192.168.126.1 192.168.126.2
```

   In this example, the domain name is resolved to two IP addresses, one for the primary server and one for the secondary server.

3 Enter this command:

   ping umsemail

   Continuing with the information in this example, you would see replies from umsemail.vcx.wan.3com.com.

Enabling Secure Copy (SCP) and Secure Shell (SSH) Commands

UMS uses shell scripts to synchronize the two servers. These scripts use the SCP and SSH commands. For these commands to work properly in this environment, you must configure each UMS server so that the commands do not prompt for a password.

Perform these steps on the voipbox1 **and** voipbox2 servers as user **app**:

1 To create the private and public keys, enter this command:

```
ssh-keygen -t dsa
```

2 When you are prompted for a key location, press **Enter** to accept the default.

3 When you are asked for a passphrase, press **Enter** to leave the passphrase blank.

Perform these steps on the designated server only, as user **app**:

1 On voipbox1, copy the public key to the voipbox2 using this command:

```
cat ~app/.ssh/id_dsa.pub | ssh app@voipbox2 "cat - >> ~app/.ssh/authorized_keys"..
```

2 On voipbox2, copy the public key to the voipbox1 using this command:

```
cat ~app/.ssh/id_dsa.pub | ssh app@voipbox1"cat - >> ~app/.ssh/authorized_keys"..
```

Network Time Protocol (NTP) Configuration

Intelligent Mirroring requires that the clocks on the two systems be synchronized to within 1 second.

> **i** *3Com recommends that you use an external NTP server to maintain time synchronization with Universal Time.*

Configuration

To configure Network Time Protocol on the two systems:

1 On the voipbox1 system, create the **/etc/ntp.conf** file.

2 Edit the file and add these lines:

```
server 127.127.1.1

fudge 127.127.1.1 stratum 8

peer voipbox2
```

> **i** *The IP address 127.127.1.1 designates the local oscillator (clock). This entry is required. If no external NTP server is configured or available, the two systems use the local oscillator. The fudge command sets the local*

*oscillator to stratum 8 in order to allow the two systems to use a lower stratum server (7 or lower) if one is available. By default, the system uses this drift file: **/etc/ntp/drift**.*

3 On the voipbox2 system, create the **/etc/ntp.conf** file.

4 Edit the file and add these lines:

```
server 127.127.1.1

peer voipbox1
```

5 On the voipbox1 server, su to root and execute these commands:

```
/etc/init.d/ntpd stop

/etc/init.d/ntpd start
```

6 On the voipbox2 server, su to root and execute the same commands:

```
/etc/init.d/ntpd stop

/etc/init.d/ntpd start
```

i *Optionally, you can add any number of additional server entries in the ntp.conf file.*

Verification To verify that the NTP service is properly configured, run this command:

```
ntpq -p
```

i *Any user can run the ntpq command.*

The output from this command shows the state of all of the ntp servers with which the local system is communicating.

2 **INSTALLATION**

This chapter describes how to install Intelligent Mirroring on the Primary Server and the Secondary Server.

Overview

Follow these instructions, in the order that they are given, when you install and configure the servers.

1 Completely install the Primary Server before you begin to install the Secondary Server. See the instructions in Primary Server Installation, next.

After you have installed the Primary Server, the system reboots itself.

2 Verify that the Primary Server is operational and that you can place calls.

3 Install the Secondary Server. See the instructions in Secondary Server Installation on .

Primary Server Installation

Follow the instructions in this section to completely install, configure, and verify the Primary Server.

> **i** *The device names of the network interfaces on your systems may vary from those used in the following examples. To obtain a list of the device names for your network interfaces, use the* `ifconfig -a` *command.*

Stopping System Software

If any version of the Unified Messaging System software is running on any of the machines in the configuration, you must perform these steps on *each* machine:

1 Stop the application using this command:

`/usr/app/gen/stopmon`

2 Verify that the application is stopped using this command:

`/usr/app/gen/hmm app`

You should see no processes in the list.

Sample Installation Script (for voipbox1)   When you first start a VCX V7000 server, a firstboot script is run. The script asks you questions and configures the software based on your answers. This section shows the portion of the firstboot script that deals with configuring Intelligent Mirroring between two VCX UMS servers.

Bold text indicates values that you must type. Press **Enter** after each entry.

> **i** *The example answers in this script assume that you are using voipbox1, that voipbox1 will be the primary server, and that voipbox2 will be the secondary server.*

```
Intelligent Mirroring configurations

Should Intelligent Mirroring be enabled (Y/N)? [N]: Y

Name of the Remote Intelligent Mirrored System?: voipbox2

Intelligent Mirroring Alias? : active

Is this host the primary or the secondary (P/S)? : P

Enter the Device Name of the Network Card? : eth0

Enter the Device Name of the Second Network Card, enter if
only one? eth1

Enter the Standby Alias? : standby
```

The portion of the firstboot script that deals with UMS Intelligentigent Mirroring has now been completed. The firstboot script continues with other configuration questions.

Secondary Server Installation

Follow the instructions in this section to completely install and configure the Secondary Server.

Sample Installation Script (for voipbox2)   When you first start a VCX V7000 server, a firstboot script is run. The script asks you questions and configures the software based on your answers. This section shows the portion of the firstboot script that deals with configuring Intelligent Mirroring between two VCX UMS servers.

Bold text indicates values that you must type. Press **Enter** after each entry.

<table>
<tr><td>**i**</td><td>*The example answers in this script assume that you are using voipbox2, that voipbox2 will be the secondary server, and that voipbox1 will be the primary server.*</td></tr>
</table>

```
Intelligent Mirroring configurations

Should Intelligent Mirroring be enabled (Y/N)? [N]: Y

Name of the Remote Intelligent Mirrored System? : voipbox1

Intelligent Mirroring Alias? : active

Is this host the primary or the secondary (P/S)? : S

Enter the Device Name of the Network Card? : eth0

Enter the Device Name of the Second Network Card, enter if
only one? eth1

Enter the Standby Alias? : standby
```

The Secondary Server now restarts itself and picks up the Line and Port configuration from the Primary Server.

The portion of the firstboot script that deals with UMS Intelligentigent Mirroring has now been completed. The firstboot script continues with other configuration questions.

Intelligent Mirroring Active/Standby Policy

Intelligent Mirroring uses one of two policies to determine which server operates in the active state and which operates in the standby state. The Primary and Balanced policies, explained next, control the two server states.

<table>
<tr><td>**i**</td><td>*The example answers in this script assume that you are using voipbox1, that voipbox1 will be the primary server, and that voipbox2 will be the secondary server.*

Configuration of a mirroring policy can be done only after the firstboot script has been completed and the VCX system has been rebooted.</td></tr>
</table>

Primary Intelligent Mirroring Policy

This policy specifies that whenever the Primary Server is running, it enters the active state. If the Secondary Server was running in the active state, the two servers negotiate so that the Secondary Server switches to the standby state.

> **i** *For new installations, the policy is set to Primary by default.*

To configure the primary policy:

1 Edit this file on the Primary Server:

    /usr/app/app.dir/config.app

2 Find the line that begins with:

    IM_policy=

3 Modify the line, if necessary, so that it reads:

    IM_policy=primary

4 Restart Call Builder on the Primary Server.

> **i** *When Call Builder restarts on the Primary Server, it is in the standby state. After 5 minutes, it switches to active state.*

Balanced Intelligent Mirroring Policy   This policy specifies that when one of the servers enters the active state, it stays in that state until it fails or someone shuts it down.

To configure the balanced policy:

1 Edit this file on the Primary Server:

    /usr/app/app.dir/config.app

2 Find the line that begins with:

    IM_policy=

3 Modify the line, if necessary, so that it reads:

    IM_policy=balanced

4 Restart Call Builder on the Primary Server.

Switching Between Active and Standby States   The Primary Server can enter the standby state in either of these two ways:

- When the Primary Server starts, the Secondary Server is in the active state. Therefore, the Primary Server enters the standby state.

    OR

- Someone issues a command to force the Primary Server into the standby state.

When the Primary Server is in the standby state, it periodically checks the value of IM_policy and, depending on the value, the Primary Server may switch from the standby state to the active state.

■ If IM_policy is set to primary, a 5-minute timer is activated. When the timer value expires, the Primary Server switches from standby to the active state and negotiates with the Secondary Server so that the Secondary Server switches to the standby state.

■ If IM_policy is set to balanced, no action is taken.

3 **OPERATION**

This chapter describes how to verify the proper operation of Intelligent Mirroring and synchronization between the servers. It also describes how to manually switch server states and how to resynchronize the databases and file systems on the two servers if that becomes necessary.

Verifying Intelligent Mirroring Operation

To verify that Intelligent Mirroring is operating properly, perform these steps on *each* server:

1 In a command window, enter this command:

xattach app

2 In the screen that appears:

a On the active server, verify that:

- The status in the Intelligent Mirroring Status window is **Active.**

- The status of each of the 4 pipes is **Alive.**

b On the standby server, verify that:

- The status in the Intelligent Mirroring Status window is **Standby.**

- The status of each of the 4 pipes is **Alive.**

- This message is not scrolling in the Message window:

VM_INIT vm_nanch:-1

> **i** *If the "VM_INIT vm_nanch: -1" message* is *scrolling in the Message Window, go to the active server and type* **killit msg4 16** *at the command line. If this does not clear the problem, then there is a network configuration problem.*

Manual Switchover   You can manually switch either server to the active or standby state, provided that you have root privileges.

1 In a command window, enter this command:

   xattach app

2 In the screen that appears, click one of these two items to command the system to switch state:

   ■ Scripts/Spawn vssu_active

   ■ Scripts/Spawn vssu_stanby

3 In the Intelligent Mirroring Status window, verify that the state changes appear immediately.

4 In the Message window, verify that the messages indicate the progress of the switchover.

Example:

The following message window sequence is typical when you command the active server to go to standby mode:

```
../app_ss.c:137 Request to become standby

../app_ss.c:193 Remote end has requested to become active

Shutdown from msg4

This side is standby

VSSI_STNDBY vm_nanch=29028
```

Verifying Server Synchronization   You can verify that the databases and the file systems on the Primary and Secondary Servers are synchronized.

Database   To verify database synchronization, at the command line, enter this command:

   tblcmp

If the databases are synchronized, you see this message:

```
Tables are identical
```

If the databases are not synchronized, you see a list of the records that are different.

<table>
<tr><td>

i

</td><td>

The synchronization of the Primary and Secondary servers is a real-time activity. The tblcmp utility gives accurate results only on an idle system (one that is not processing telephone calls).

</td></tr>
</table>

To re-synchronize the databases:

1 On the active server, at the command line enter this command:

xattach app

2 In the screen that appears, click **Scripts/Spawn vssu_sync.**

3 In the blue **Tables** window that appears, click the SS button to select all the tables that are synchronized with Intelligent Mirroring.

4 Page down until you see checked boxes that indicate that the associated tables are selected for synchronization.

5 Click the **UD** button to synchronize the selected tables.

The standby server is updated and restarted.

File System   To verify that the file systems are synchronized, follow the procedures in this section.

At the command line on both the Primary and Secondary Servers:

1 Enter this command:

diffmsg

If there are many files on the system, the diffmsg utility may take some time to complete operation.

When the diffmsg utility stops, the system displays these two file counts:

■ **Files to copy:** — The number of files that exist on the other server but do not exist on the local server.

■ **Files to remove:** — The number of files that exist on the local server but do not exist on the other server.

If the value of files to copy is 0 (zero), then the file system is synchronized from the perspective of the local server.

2 If the value of files to copy is not 0 (zero), then enter the command:

diff2rcp

This command creates a shell script (/usr/app/app.dir/diffmsg.rcp) that you can run from the command line to copy the missing files from the other server.

3 If the value of files to remove is not 0 (zero), then run this command on the local server:

diffmsg

and run this command on the other server:

diff2rcp

> *To run the synchronization command line utilities, both servers must have secure shell information configured (see <u>"Enabling Secure Copy (SCP) and Secure Shell (SSH) Commands"</u> on <u>page 16</u>).*

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